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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/691,746

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Dimitry Shur

8640

1979

7590 10/12/2007
PATENT COUNSEL
APPLIED MATERIALS, INC.
Legal Affairs Department
P.O. BOX 450A
Santa Clara, CA 95052

EXAMINER

JOHNSTON, PHILLIP A

ART UNIT	PAPER NUMBER
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2881

MAIL DATE	DELIVERY MODE
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10/12/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/691,746

Applicant(s)

SHUR ET AL.

Examiner

Phillip A. Johnston

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

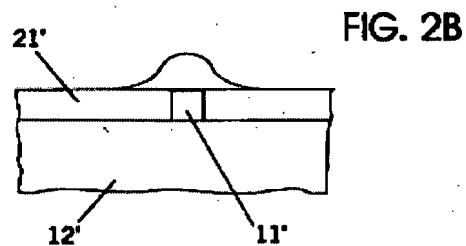
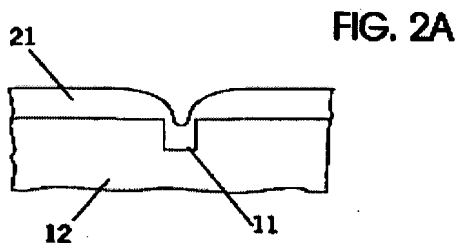
1. This Office Action is submitted in response to the Petition Decision mailed 10-1-2007 granting the Petition to Revive filed 4-20-2007. As a result, this Office Action addresses the amendment filed 10-27-2006, wherein claims 1-18 are pending.

Response to Arguments

2. Applicant's arguments filed 10-27-2006 have been fully considered but they are not persuasive.

3. Applicant argues at pages 3 and 4 of the remarks that independent claims 1,6, and 15 should be allowed because; Chen does not disclose a stage of directing a primary electron beam to interact with an inspected object that includes a first feature formed on a first layer and second feature formed on a second layer wherein the second feature is buried under the first layer and affects a shape of an area of the first layer. Chen discloses a single feature that may be covered by a coating layer.

4. The examiner disagrees. Chen teaches, at Col. 5, line 3-55, directing an electron beam at buried alignment marks 11 and 11' (note Figures 2A and 2B below), where the buried alignment marks have produced a trench and a mesa in layers 21 and 21' respectively.



The examiner has interpreted from the above that the trench and mesa in layers 21 and 21' are first features produced above second features 11 and 11', where the trench and mesa in layers 21 and 21' are defined as features since they are prominent or conspicuous parts, per Webster's Collegiate Dictionary, 10th Edition.

5. The rejection of claims 1,3,4,6,8,9,15, and 17 under 35 USC 102 (b) to Chen, and the rejection of claims 2,7,11-14,16, and 18 under 35 USC 103(a) by Chen in view of Hiroi, and in further view of Sawahata is maintained.

6. All claims stand finally rejected.

Claims Rejection - 35 U.S. C. 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1,3,4,6,8,9,15 and 17 are rejected under 35 U.S.C. 102 (b) as being anticipated by Chen, U.S. Patent No. 6, 064,486.

Chen (486) discloses the following;

(a) Determining overlay error by detecting the position of an alignment mark 11 or 11' on substrate 12 or 12', by imaging the substrate including the alignment mark when directing an electron beam from radiation source 13 and producing an alignment signal 15 or 15'. The signal is produced when scattered radiation from the layers are detected by detector 14 or 14' and processed in processor 16 or 16', as recited in claims 1,3,4,6,9, and 15. See Column 5, line 3-55; and Figures 1A -2B below;

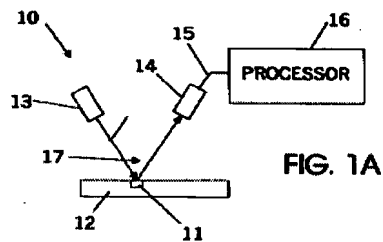


FIG. 1A

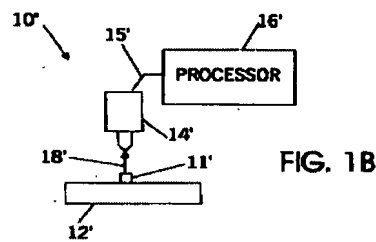


FIG. 1B

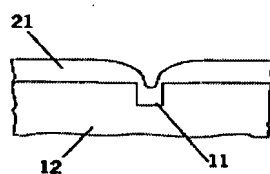


FIG. 2A

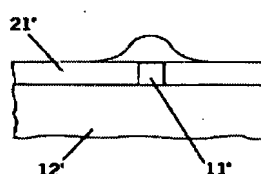


FIG. 2B

(b) The second feature 11 or 11' affecting the shape of the area 21 or 21' on first layer, as recited in claims 1,8, and 17. See Column 5, line 62-67; Column 6, line 1-8; and Figures 2A and 2B above.

Claims Rejection – 35 U.S.C. 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2,7,11-14, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,064,486 to Chen, and Hiroi, U.S. Patent No. 6,172,365, in view of Sawahata, U.S. Patent No. 6,501,077.

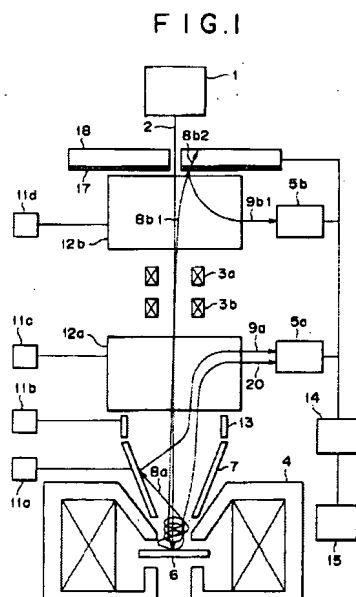
Chen (486) as described above discloses all the limitations of claims 1-18 but fails to teach the use of preliminary charging the second feature, as recited in claims 5 and 10. However, Hiroi (365) discloses pre-charging the sample surface to improve

image resolution in an electron beam inspection apparatus. See Column 13, line 26-56.

Therefore it would have been obvious to one of ordinary skill in the art that the overlay error detection apparatus and method of Chen (486) can be modified to use the pre-charge method of Hiroi (365), to provide an electron beam inspection method, and apparatus, for reducing the charge-up phenomenon and obtaining a high-contrast signal representing a physical property by using secondary electrons or back-scattered electrons obtained from the object.

The combination of Chen (486) and Hiroi (365) fails to teach the detection of electrons reflected or scattered at small angles, as recited in claims 2,7,11-14, 16 and 18.

However, Sawahata (077) discloses detecting reflected electron 8a generated at a low angle from the sample, using detector 5a. See Column 4, line 33-47; and Figure 1 below.



Therefore it would have been obvious to one of ordinary skill in the art that the overlay error detection apparatus and method of Chen (486) and Hiroi (365) can be modified to use the detection of low angle reflected electrons in accordance with Sawahata (077) to provide a scanning electron microscope where reflective electrons generated from a sample at a low angle can be detected efficiently.

Drawing objection

5. The drawings are objected to under 37 CFR 1.83(a) because they fail to show target 110 in Figures 4a and 4b, as described in the specification at paragraphs [0058] and [0059]. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the

applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Conclusion

7. The Amendment filed on 10-27-2006 has been considered but is ineffective to overcome the references cited in the Office Action mailed 7-31-2006.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 6:30 am to 3:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim can be reached at (571) 272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ
October 8, 2007


ROBERT KIM
SUPERVISORY PATENT EXAMINER